

1 **CLAIMS**

2 1. A method of forming a semiconductor device comprising:

3 forming at least one conductive structure within a plurality of
4 semiconductor substrates, said act of forming comprising first forming said at least
5 one conductive structure to extend into a respective semiconductor substrate a
6 distance that is less than an elevational thickness of the substrate, and second
7 removing substrate material elevationally adjacent said one conductive structure
8 effective to expose a surface of said one conductive structure, at least portions of
9 one of the conductive structures having oppositely facing, exposed outer surfaces;
10 and

11 stacking individual substrates together such that individual conductive
12 structures on each substrate are in electrical contact with the conductive structures
13 on a next adjacent substrate.

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15 2. The method of claim 1, wherein said stacking of the substrates
16 comprises stacking singulated semiconductor die.

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18 3. The method of claim 1, wherein said at least one conductive structure
19 comprises aluminum.

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21 4. The method of claim 1, wherein said at least one conductive structure
22 comprises multi-layered pad structures.

1 5. The method of claim 1, wherein said at least one conductive structure
2 is not disposed at the periphery of the substrates.

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4 6. The method of claim 1, wherein said stacking of the substrates
5 comprises stacking singulated die, and wherein said at least one conductive
6 structure is disposed within the center of the die.

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8 7. The method of claim 1, wherein the substrates support memory
9 devices.

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11 8. The method of claim 1, wherein the substrates support DRAM
12 devices.

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14 9. A method of forming a semiconductor device comprising: √
15 forming at least one conductive structure within each of a plurality of
16 semiconductor substrates, said at least one conductive structure comprising a
17 multi-layered structure formed through successive depositions and etchings and
18 having oppositely-facing surfaces;

19 exposing portions of each oppositely-facing surface on at least one of the
20 substrates; and

21 processing the substrates sufficient to form electrical connections between
22 the substrates, said processing comprising stacking the substrates on one another
23 so that the conductive structures on adjacent substrates are electrically connected.

1 **10.** The method of claim 9, wherein said exposing comprises removing
2 portions of said at least one substrate to expose at least one of the oppositely-
3 facing surfaces.

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5 **11.** The method of claim 9, wherein said exposing comprises etching
6 portions of said at least one substrate to expose at least one of the oppositely-
7 facing surfaces.

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9 **12.** The method of claim 9, wherein said exposing comprises selectively
10 etching portions of said at least one substrate relative to material from which the
11 conductive structure is formed to expose at least one of the oppositely-facing
12 surfaces.

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14 **13.** The method of claim 9, wherein said processing comprises forming
15 additional conductive material over and in electrical contact with said exposed
16 portions.

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18 **14.** The method of claim 13, wherein said forming of the additional
19 conductive material comprises plating conductive material over and in electrical
20 contact with said exposed portions.

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22 **15.** The method of claim 13, wherein said forming of the additional
23 conductive material comprises plating more than one conductive material over and
24 in electrical contact with said exposed portions.

1 **16.** The method of claim 13, wherein said conductive structures
2 comprise aluminum, and said forming of the additional conductive material
3 comprises plating material comprising nickel over and in electrical contact with
4 said exposed portions.

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6 **17.** The method of claim 16, wherein said forming of the additional
7 conductive material comprises plating at least one other conductive material over
8 the material comprising nickel.

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10 **18.** The method of claim 16, wherein said forming of the additional
11 conductive material comprises plating at least one other conductive material
12 comprising gold over the material comprising nickel.

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14 **19.** A method of forming a semiconductor device comprising:
15 forming at least one conductive structure within each of a plurality of
16 semiconductor substrates, each conductive structure having oppositely-facing
17 surfaces;

18 after said forming, exposing portions of at least one oppositely-facing
19 surface on at least one of the substrates, said exposing comprising etching portions
20 of said at least one substrate to expose said at least one surface; and

21 processing the substrates sufficient to form electrical connections between
22 the substrates by stacking the substrates on one another so that electrical
23 connection can be made between conductive structures on adjacent substrates, said
24 processing comprising:

1 forming additional conductive material over and in electrical contact
2 with said exposed portions; and

3 bonding at least some of the additional conductive material on one
4 substrate with additional conductive material on another of the substrates.

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6 **20.** The method of claim 19, wherein the forming of the additional
7 conductive material comprises plating the additional conductive material over said
8 exposed portions.

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10 **21.** The method of claim 19, wherein the forming of the additional
11 conductive material comprises plating more than one additional conductive
12 material over said exposed portions.

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14 **22.** The method of claim 19, wherein said semiconductor substrates
15 support memory devices.

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17 **23.** The method of claim 19, wherein said semiconductor substrates
18 support DRAM devices.

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20 **24.** A method of forming a semiconductor device comprising:
21 forming at least one multi-layered, conductive pad structure within each of
22 a plurality of semiconductor substrates, each conductive pad structure having
23 oppositely-facing surfaces;

1 exposing portions of each oppositely-facing surface on at least one of the
2 substrates, at least one oppositely-facing surface being exposed by etching
3 portions of said at least one substrate to expose said at least one surface; and

4 after said exposing, forming additional conductive material over and in
5 electrical contact with said exposed portions by plating more than one additional
6 conductive material over said exposed portions.

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8 **25.** The method of claim 24 further comprising after said forming of the
9 additional conductive material, stacking the substrates on one another and bonding
10 at least some of the additional conductive material on one substrate with additional
11 conductive material on another of the substrates.

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1 **26.** A method comprising:

2 a step for providing a multi-layered structure within a plurality of
3 substrates, the multi-layered structures having a front side and a back side;

4 a step for thinning at least one of the substrates after providing the multi-
5 layered structure;

6 a step for exposing portions of the back side of a multi-layered structure of
7 said at least one substrate that was thinned;

8 a step for forming additional conductive material over and in electrical
9 contact with the multi-layered structure of the substrate that was thinned; and

10 a step for stacking the substrates such that the multi-layered structures with
11 the substrates are in electrical contact with one another.

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13 **27.** The method of claim 26, wherein the step for thinning comprises
14 mechanically abrading said at least one substrate.

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16 **28.** The method of claim 26, wherein the step for exposing portions of
17 the back side of the multi-layered structure of said at least one substrate comprises
18 selectively etching substrate material relative to material from which the multi-
19 layered structure is formed.

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21 **29.** The method of claim 26, wherein the step for forming additional
22 conductive material comprises forming a first conductive material over the multi-
23 layered structure and then forming a second different material over the first
24 conductive material.